

Remarks

In view of the foregoing amendments and the following remarks, reconsideration of the outstanding office action is respectfully requested.

Initially, applicants would like to thank Examiner Pyon for the courtesy extended to the undersigned representative during the personal interview held on June 10, 2009. The substance of the interview is reflected in the following remarks.

Before addressing the amendments presented above, applicants would like to highlight the significance of the present invention. The present invention deals with fire barrier compositions for use in the insulating layer of cables or in fire barrier articles, such as seals for windows, doors or penetrations used to convey building services between floors or walls within a building. In the event of a fire, the fire barrier compositions are required to maintain essential power and communications for as long as possible to permit safe evacuation of the building occupants and to provide communications and power for effective fire fighting. The applicants have found that the claimed compositions allow the dimensions of fire barrier components substantially to be maintained under fire conditions and that, as a result, the strength of the insulation is much higher than it would otherwise be in the event of a fire. Significant intumescence and expansion in a fire, which is a feature of some prior art compositions, leads to weakening of fire barrier structures and also strain being placed on the composition (particularly in structures such as cables). Consequently, the structure more readily disintegrates.

As discussed below, the examples of the present application demonstrate the criticality of the claimed composition for achieving the recited results.

This submission is accompanied by the following documents: an Information Disclosure Statement citing 64 references (29 submitted herewith); a Declaration of Pulahinge Don Dayananda Rodrigo under 37 C.F.R. § 1.132 (“Rodrigo Declaration”), and a Petition for Extension of Time. All fees associated with this submission, including the \$180 fee for the IDS and the \$555 fee for the extension of time should be charged to deposit account 14-1138. Any excess fees or fee deficiencies can be applied to this same account.

By the above amendments, claims 1, 11, 15, and 35 have been amended and claim 4 has been cancelled without prejudice. The amendments to claim 1 find descriptive support in

original claim 4; and at page 3, line 28 to page 4, line 5; page 5, lines 6-14; page 13, lines 1-3 and 18-20.

Page 5, lines 6-14, describes the use of the inorganic phosphate but indicates that the composition is “preferably essentially free of additional intumescent agents.” Elsewhere, the specification indicates that the composition is “preferably essentially free of intumescent agents such as melamine, melamine phosphate, melamine pyrophosphate, pentaerythritol, and the like” (page 13, lines 1-3). This would teach to the skilled artisan that the compositions of the present invention are intended not to include appreciable amounts of traditional intumescent agents of the type known in the prior art. Indeed, the specification at page 13, lines 18-20, places an upper limit on the amount of such intumescent agents (the composition “will contain less than 1% by weight of the composition of melamine and pentaerythritol”). Therefore, the amendments to claim 1 do not introduce new matter.

The language of claims 11, 15, and 35 has been amended to ensure there is an explicit antecedent basis for the limitations. No new matter has been introduced by these amendments.

Claims 1, 3, 5-29 and 33-37 remain pending and under examination.

The rejection of claims 11, 15, and 35 under 35 U.S.C. §112 (second paragraph) for indefiniteness is overcome by the above amendments. This rejection should be withdrawn.

The rejection of claim 1, 3-14, 16-29, 33, 34, 36, and 37 under 35 U.S.C. § 103(a) for obviousness over U.S. Patent Application Publ. No. 2004/0216914 to Vexler (“Vexler”) is respectfully traversed.

Vexler teaches a nanocomposite material for use in cables. The Vexler nanocomposite material includes a polyolefin matrix, silicates/organic clays, and intumescent agents. The intumescent agents include those of the system recited in paragraphs [0027]-[0032], which includes a desiccant, a source of carbon, a source of nitrogen, and an expanding agent. Paragraph [0037] is the only paragraph that describes the amount of intumescent agents, and the content described is “at least about 50% intumescent type additives.” Paragraph [0059] is the only paragraph that supports the amount of silicates/organic clays that are present, and this paragraph indicates that 2% of a nanocomposite clay is present in nanocomposite “inner layer.”

In this embodiment, the inner layer exhibited a 60% increase in volume following exposure to fire conditions.

Vexler is deficient in several respects to claim 1. Firstly, Vexler fails to teach or suggest a ceramifying composition that includes at least 10% by weight of silicate mineral filler. The only guidance provided by Vexler is 2% by weight nanocomposite clay, as noted above. Secondly, Vexler fails to teach or suggest the presence of “8 % to 40 % by weight of at least one inorganic phosphate that forms a liquid phase at a temperature of no more than 800°C.” While Vexler indicates usage of inorganic phosphate, it is only in combination with other components of the intumescent system, which as noted above includes a desiccant, a source of carbon, a source of nitrogen, and an expanding agent. There is no guidance from Vexler as to the content of the inorganic phosphate, simply the guidance that the intumescent additives constitute “at least about 50%” of the composition. Thirdly, Vexler fails to teach or suggest a composition that “comprises less than 1% by weight of the composition of intumescent agents other than said inorganic phosphate.”

Vexler is deficient in several respects to claim 3. Firstly, Vexler fails to teach or suggest a composition that includes “8-40% by weight of at least one inorganic phosphate that forms a liquid phase at a temperature of no more than 800°C, based on the total weight of the composition.” While Vexler indicates usage of inorganic phosphate, it is only in combination with other components of the intumescent system, which as noted above includes a desiccant, a source of carbon, a source of nitrogen, and an expanding agent. There is no guidance from Vexler as to the content of the inorganic phosphate, simply the guidance that the intumescent additives constitute “at least about 50%” of the composition. Secondly, Vexler fails to teach or suggest a composition that includes “at least 10% by weight, based on the total weight of the composition, of silicate mineral filler.” The only guidance provided by Vexler is 2% by weight nanocomposite clay, as noted above. Finally, Vexler teaches the presence of other additives that are necessarily excluded by the “consisting essentially of” transition language. In particular, Vexler indicates that the intumescent additives constitute “at least about 50%” of the composition and that such a system necessarily includes four classes of components: a desiccant, a source of carbon, a source of nitrogen, and an expanding agent. The use of substantial amounts of expanding agents such as melamine and pentaerythritol, which result in instability of the fired

product, is specifically excluded because these agents materially affect the properties of the composite material. Vexler does not teach their substantial omission, but rather their inclusion.

Given the absence of any teaching or suggestion concerning these specific ranges of the claimed composition, or which specific component of the intumescent system of Vexler should be excluded or limited within the manner recited in claims 1 and 3, a person of ordinary skill in the art would lack any basis for making a composition of the present invention.

Vexler also provides no basis for expecting success in preparing a composition as recited in any of claims 1 and 3, or any claims dependent thereon, which can operate to form a “self-supporting ceramic on exposure to an elevated temperature experienced under fire conditions.”

Given these deficiencies, the rejection of claims 1, 3-14, 16-29, 33, 34, 36, and 37 for obviousness over Vexler is improper and should be withdrawn.

The rejection of claims 15 and 35 under 35 U.S.C. § 103(a) for obviousness over Vexler in view of U.S. Patent No. 6,555,605 to Casiraghi (“Casirhagi”) is respectfully traversed.

The teachings and deficiencies of Vexler with respect to claims 1 and 3 are noted above. The U.S. Patent and Trademark Office (“PTO”) at pages 4-5 of the office action cites Casirhagi for teaching the use of calcium carbonate, and asserts that it would have been obvious to introduce calcium carbonate into the Vexler composition to arrive at the claimed compositions. Applicants submit that even if, assuming *arguendo*, one of ordinary skill in the art were motivated to introduce the recited amount of calcium carbonate (which applicants do not admit), then the PTO has still failed to demonstrate how Casirhagi overcomes the several deficiencies of Vexler with respect to claims 1 and 3. Therefore, the obviousness rejection of claims 15 and 35 is improper and should be withdrawn.

The rejection of claims 1, 3-29, and 33-37 under 35 U.S.C. § 103(a) for obviousness over Casiraghi in view of Vexler is respectfully traversed.

Casirhagi teaches an additive composition that is intended to be used with a polymer system. The additive composition includes magnesium hydroxide, calcium carbonate, at least a phosphorous compound, and at least a nitrogen compound. Casirhagi teaches that the magnesium hydroxide and calcium carbonate are present in a ratio of ~ 3:1 to 2:3, and that the

combination of these agents is present in a 1:1 up to 2:1 weight ratio with the polymer component. The phosphorous component is present in weight ratio with respect to the base polymer of 1:100 up to 1:300. Thus, the phosphorous component is a minor component.

Example 1 of Casirhagi demonstrates this in Table 1, where the additives contain between 5 and 8 parts by weight of inorganic phosphate. Given the parts by weight of other components, the phosphate is present in an amount of between about 3.2 percent up to 5 percent by weight. And this is just for the additive. When base polymer is introduced to form the composition, the weight percentage of the phosphate is further diminished.

The PTO asserts on page 5 of the office action that it would have been obvious to introduce into the composition of Casirhagi a silicate as taught by Vexler, and thereby obtain a composition as claimed. Applicants disagree for several reasons.

Firstly, as noted above, Casirhagi is deficient in teaching a composition that includes “8-40% by weight of at least one inorganic phosphate that forms a liquid phase at a temperature of no more than 800°C, based on the total weight of the composition” as recited in claims 1 and 3, and the PTO has failed to demonstrate how Vexler overcomes this deficiency. For the reasons noted above, applicants submit the PTO cannot given the deficiency of Vexler in this regard.

Secondly, as noted above, Casirhagi is deficient in teaching a composition that includes “at least 10% by weight, based on the total weight of the composition, of silicate mineral filler.” Vexler does *not* overcome this deficiency, because the only guidance provided by Vexler is silicate in the amount of 2 weight percent. Therefore, even if one of ordinary skill in the art were to combine the teachings of Vexler and Casirhagi, the combination would fail to arrive at the claimed invention.

Thirdly, both Vexler and Casirhagi describe the use of similar intumescent systems. *See* Rodrigo Declaration, at ¶¶ 7-8. Given the claim limitations specifying that the composition of claim 1 “comprises less than 1% by weight of the composition of intumescent agents other than said inorganic phosphate” and that the composition of claim 3, with the transition language “consisting essentially of” excludes significant amounts of various expanding agents that negatively impact the properties of the composition (such as melamine and

pentaerythritol), the combination of Vexler and Casiraghi fail to suggest a composition that satisfies these limitations.

Fourthly, applicants submit that even if one of skill in the art were to have made the combination asserted by the PTO, the resulting combination would fail to achieve a composition that “forms a self-supporting ceramic on exposure to an elevated temperature experienced under fire conditions” as required by claims 1 and 3, and claims dependent thereon. This is evidenced by the accompanying Rodrigo Declaration. In particular, the Rodrigo Declaration at ¶¶ 9-12 (and Exhibits 2-3 attached thereto) demonstrates that the substitution of nano-composite clay of the type described by Vexler into a composition of Casirhagi does not result in a composition that forms a self-supporting ceramic on exposure to an elevated temperature experienced under fire conditions.

Finally, applicants submit that the criticality of the recited ranges is demonstrated in the Examples of the present invention (as well as by the accompanying Rodrigo declaration). In Table 3 of the present application, comparison of compositions P and L shows that P, which does not contain a silicate mineral filler, results in a ceramic residue after firing which is much weaker than the corresponding composition of the invention (composition L) with 25% silicate mineral (talc). The comparison of the invention with the combined teaching of Vexler and Casiraghi (see Rodrigo declaration) show the presence of 75% silicate mineral provides a residue significantly stronger than 6% silicate (with other non silicate minerals) in the comparison. Composition E (Example 3 of the present application) also demonstrates the importance of the inorganic phosphate, as does Example O, each of which are unsatisfactory in the absence of the inorganic phosphate. Example 5 also demonstrates the importance of the relative amounts of components, and the omission of other intumescent agents such as melamine and pentaerythritol.

For all these reasons, the rejection of claims 1, 3-29, and 33-37 for obviousness over the combination of Casiraghi and Vexler is improper and should be withdrawn.

In view of all of the foregoing, applicants submit that this case is in condition for allowance and such allowance is earnestly solicited.

Respectfully submitted,

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